Q
11
S28X
NH

T332

BULLETIN

OF THE

SCIENTIFIC SOCIETY OF SAN ANTONIO.

Founded 1904

VOL. I. JANUARY, 1905. NO. 1.

CONTENTS:

	PAGES
Report on the Excavation of Mastodon Remains, undertaken by a Committee of the Scientific Society of San Antonio, by BERNARD MACKENSEN, B. S.	3—10
Original Observations, with Photographic Illustrations, on Reptiles and Insects of Texas, by R. MENGER, M. D.	11—31

PUBLISHED BY THE SOCIETY,
SAN ANTONIO, TEXAS, U. S. A.

BULLETIN

OF THE

SCIENTIFIC SOCIETY OF SAN ANTONIO.

VOL. I. JANUARY, 1905. NO. 1.

PUBLISHED BY THE SOCIETY,
SAN ANTONIO, TEXAS, U. S. A.

COMMITTEE ON PUBLICATION.

B. Mackensen, B. S., *Chairman.*
John P. Rote, M. D.
W. L. Bringhurst, Ph. D.

Edward W. Heusinger, *Secretary.*

REPORT ON THE EXCAVATION OF MASTODON REMAINS, UNDERTAKEN BY A COMMITTEE OF THE SCIENTIFIC SOCIETY OF SAN ANTONIO.

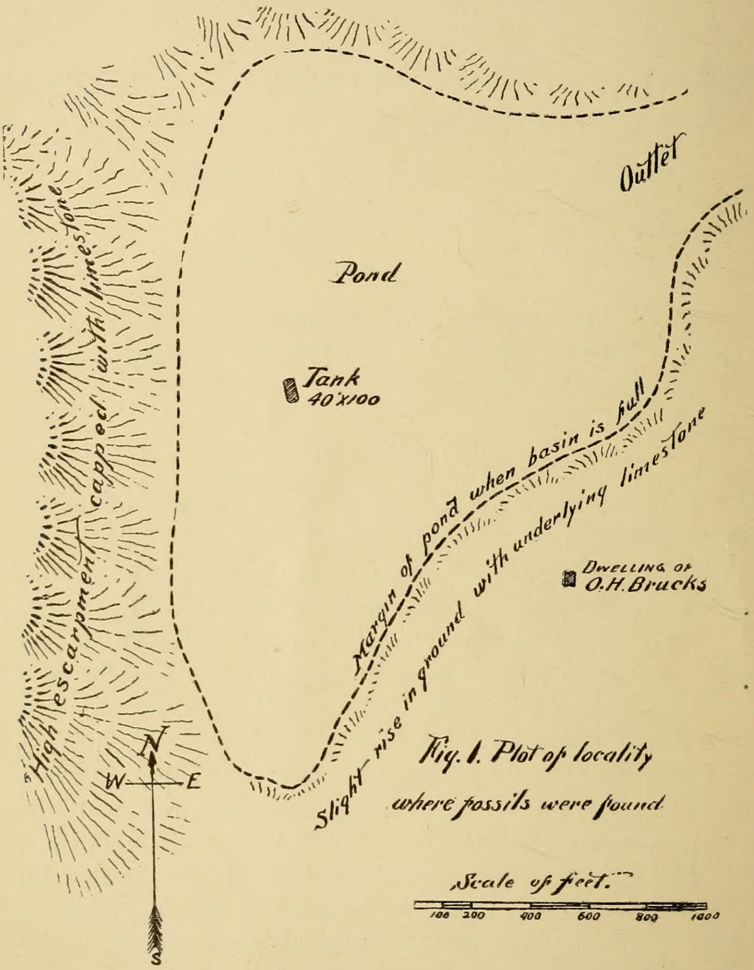
By Bernard Mackensen, B. S.,

READ BEFORE THE SOCIETY SEPTEMBER 13, 1904.

PRELIMINARIES.

On the morning of August 18, 1904, a committee of the society, consisting of Col. J. Pitman, U. S. A., Mr. Edward W. Heusinger, and myself, set out for Hondo for the purpose of carrying out the wishes of the society as to the investigation of the reported finds of fossil remains of the mastodon in that locality, and to report on the advisability of excavating the same for the society. Arriving at Hondo about 11 a. m., we were met at the station by Dr. A. J. Glaser, to whom we are indebted for information as to the different localities near Hondo in which mastodon remains have been found, and for other courtesies shown us while in that town. After making some inquiries it was decided that the most promising field of investigation for the committee was to be found on the ranch of Mr. O. H. Brucks, situated some 14 miles north-northeast of Hondo on the border of the Edwards plateau. Immediately after dinner our party, consisting of Dr. Glaser, Mr. L. J. Brucks, the members of the committee, and a colored driver, and occupying two vehicles, set out for the locality determined on. After a brisk drive of something over two hours we arrived at our destination, where we were met by Mr. O. H. Brucks, and immediately escorted by him to the spot where the find had been made.

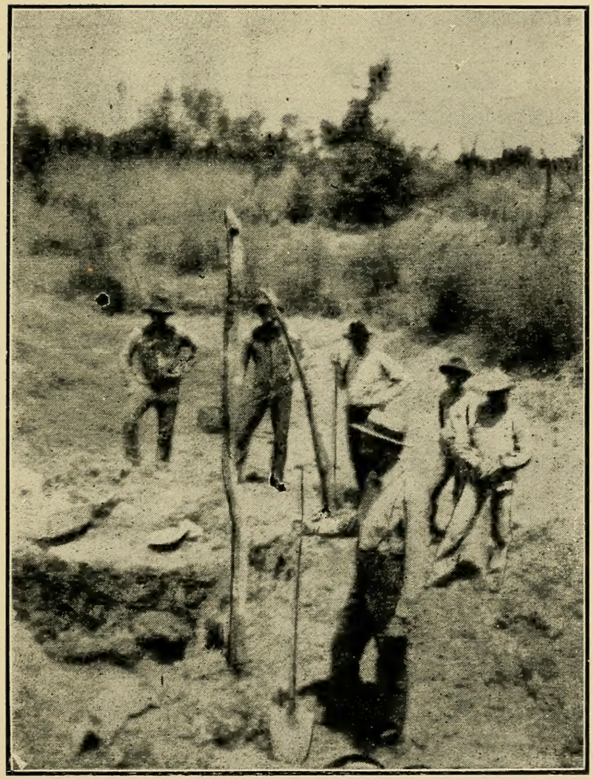
DESCRIPTION OF LOCALITY.



Outlet
Pond
Tank
40'x100
Margin of pond when basin is full
Slight rise in ground with underlying limestone
Dwelling of
O.H. Brucks
High escarpment capped with limestone
N
W
E
S
Scale of feet.
100 200 400 600 800 1000

Fig. 1. Plot of locality where fossils were found

The fossils were found about nine feet below the earth's surface, near the middle of a low, flat tract of land (see Fig. 1, which is a rough plat of the locality). On the west this flat is bounded by an escarpment of Cretaceous rock, from 200 to 300 feet in height and running approximately north and south. About midway between the bottom and the top of the escarpment there is an exposure of the Exogyra arietina clay—beds of the Lower Cretacious period, containing the characteristic little



Sight of Excavations.

shell of the ram's-horn oyster (*Exogyra arietina*). On the south and east the flat is bordered by a slight rise in the ground, with underlying limestone. This tract is a shallow basin, as evidenced by its becoming in large part converted into a pond after a heavy rain. The maximum depth of the water is then about 18 inches, the excess flowing off toward the northeast.

Some three years ago Mr. Brucks excavated, near the deepest portion of the basin, a tank measuring about 40x100 feet, with a maximum depth of six feet (Plate I). Wishing to determine whether the underlying materials were impervious to water, Mr. Brucks dug a test hole, and in so doing unearthed the first mastodon remains discovered in this locality. Mr. Brucks possessed the good judgment to return the fossils to their long resting place and refill the hole, hoping thus to prevent the rapid disintegration of these remains as well as of any others that might be lying near by.

EXCAVATION OF THE FOSSILS.

Our party promptly began excavating, although the heat was intense in the bottom of the tank, and there was no shade near by. Laying off our coats, we worked by turns, removing a black waxy earth, just wet enough to make it stick to our tools. As a rule, the shovel had to be cleaned after the removal of each shovelful of mud. Naturally there was soon a great demand for water, and this was kindly supplied by Mr. Brucks from his well, but it proved to be impure, by the tests of both sight and taste, probably being seepage water from the pond. Under the circumstances we were not disposed to be hypercritical, however, and partook freely at short intervals. After descending about two feet we struck a layer of grayish clay, which we found nearly as hard to work in as the black soil. We had been encouraged meanwhile by the discovery of several small fragments of bone.

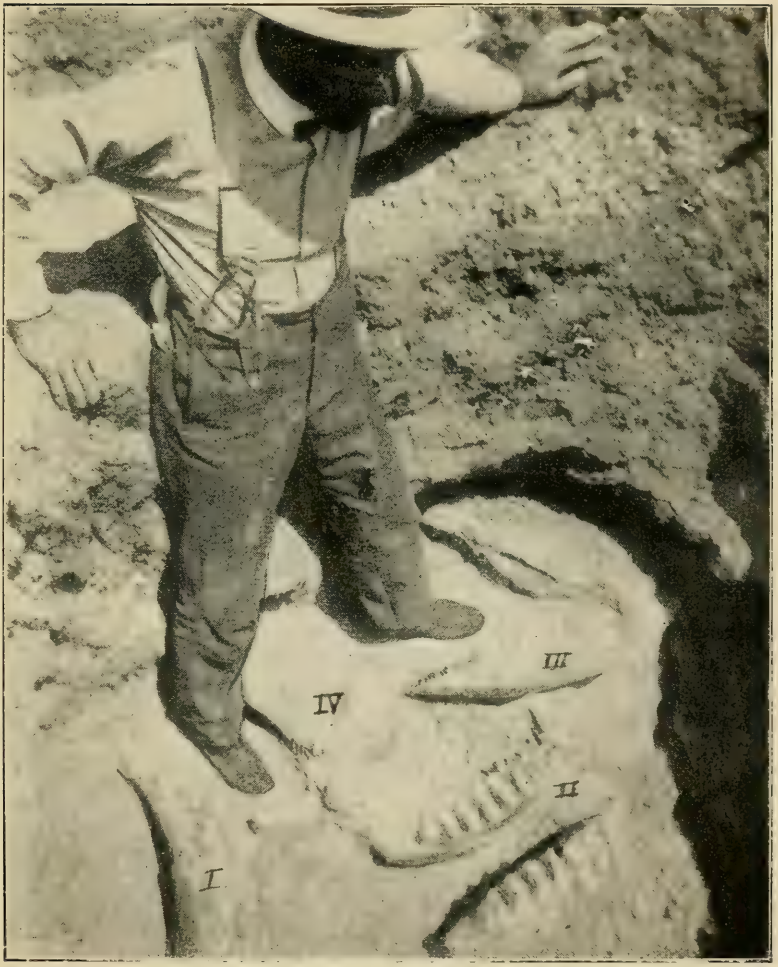
The members of the committee had hoped to be able to return to San Antonio on the same day, and Col. Pitman now announced that he was obliged to return on the evening train. The time of departure to catch this train was drawing near, and yet no fossils worth mentioning had been found. Finally, when we saw that we could tarry no longer, the person in the hole was asked to take the grubbing-hoe and strike several hard blows just in the center of the bottom as a last effort to find the objects of our search. Several blows were struck, and then as the implement descended again, a sharp sound fell on our ears, as if something hard had been struck. A ray of hope lit up every countenance, and upon examination it was found that we had come in contact with the enamel of a large tooth.

Dr. Glaser and Col. Pitman now set out for Hondo, leaving Mr. Heusinger and myself, who had decided to continue the excavations. We worked, with encouraging results, till evening, and then returned to Hondo, arriving there at nine o'clock. Next morning we made an early start for our field of operations, taking along, besides the driver, a colored workman, with tools. The hole had been started too small, and we now enlarged it to a diameter of about five feet. The work in the fossil-bearing stratum was slow and tedious on account of the danger of injuring the remains—the hidden as well as the exposed ones. At twelve o'clock the various fossils had been laid bare as far as the dimensions of the hole would permit. The great jaws, tusks, and other relics of the prehistoric monsters in their resting place of thousands of years was a sight of intense interest, bordering on the uncanny. We decided to preserve this remarkable spectacle with the aid of the photographer's art, and accordingly Mr. Heusinger took several snap-shots of the remains while the excavation was fully illuminated by the midday sun (Plate II).

After eating our lunches, Mr. Heusinger and the colored men resumed work, while I took a short stroll for the purpose of studying the geology of the locality. Upon my return all the fossils had been removed from the excavation, but alas! they had fallen to pieces in the operation. They were packed in boxes and placed in the vehicle. Having expressed our thanks to Mr. Brucks for his generosity in permitting the society to exhume and remove the fossils, and for his constant assistance during these operations, we set out on our return trip to Hondo.

THE RETURN TRIP.

Our driver, who fortunately knew the whole country like a book, was asked to take a route by way of Mumme's ranch and



View of excavation, showing mastodon bones in situ. I, tusk; II, lower jaw; III, another lower jaw upside down; IV, thigh bone, etc.

Lacy's quarry, places at which we hoped to find something of scientific interest. At the ranch, four or five miles northeast of Hondo, we were shown the spot from which were once taken some large bones, presumably of a mastodon. This place is in the bank of Verde creek, but three feet above the bottom of its bed. It lies in an old flood plain, built by the stream in former times, but which now is on the outside of a bend, and hence is being cut away. This accounts for the exposure of the fossils.

The quarry was found to be a great ledge of calcareous sandstone extending across the bed of Hondo creek, two miles northeast of the town of Hondo. I had seen flagstones bearing ripple marks in the sidewalks of Hondo, and had made inquiries as to the source of the material, thinking that I might there find something of interest. I was informed that it was Lacy's quarry. On inspecting these rocks I was not in the least disappointed, for here were large exposures of the most perfect ripple marks (Plate III).

The flags so commonly used for sidewalks in San Antonio, and which also often afford examples of ripple marks, are presumably of the same geological formation. With the aid of a crowbar we attempted to secure a specimen of this beautifully marked rock, but owing to its firmness and the intensity of the heat, we soon abandoned the attempt. But the next best thing—a picture—was more easily to be had, and before we departed Mr. Heusinger succeeded in taking some very satisfactory views.

Arriving in Hondo, we proceeded to repack our specimens preparatory to shipping them by express to their destination. While thus employed, a large number of curious townspeople congregated about us to view these weird relics of a bygone age. In due time we took the train for San Antonio, glad to return home but with a feeling of satisfaction as to the results of our trip.

DESCRIPTION OF THE FOSSILS.

1. A tusk (Plate II, 1). About 30 inches of this fossil were uncovered and removed. It was necessarily broken in the latter operation, as both ends were still imbedded. The part removed separated into several pieces, the ivory being poorly pre-

served. The diameter of this part varied from 5 to 6 1-2 inches. It contained no portion of the pulp cavity.

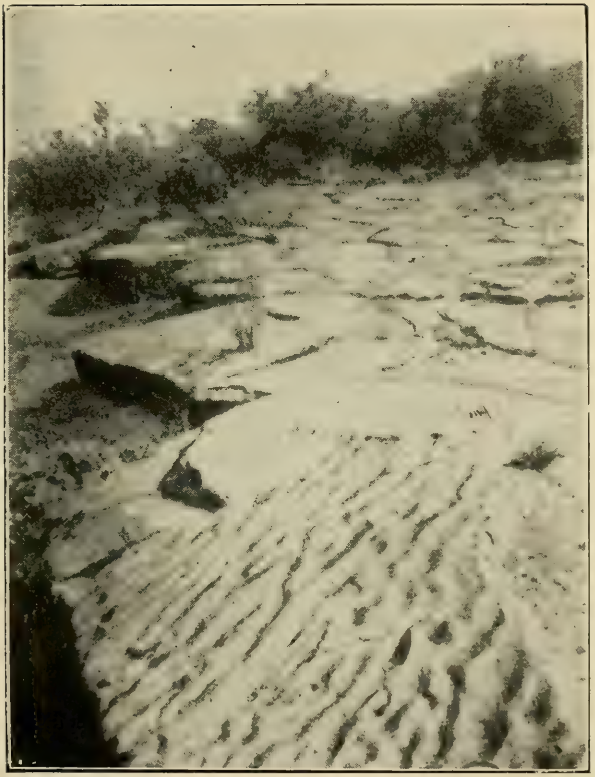
2. A lower jaw (Plate II, 2). The bone of this specimen broke into many pieces, so that the teeth are no longer imbedded in it. The latter are fairly well preserved. There were two molars on each side, the first (Plate IV, 3 and 4) having three cross ridges, and the last (Plate IV, 1 and 2), four of these ridges and a final elevation, or heel. This last molar measures 9 inches from front to rear. From these facts I infer that the owner of this jaw was an adult animal of the Trilophodon section of the genus *Mastodon.*

3. A lower jaw (Plate II, 3). This specimen went to pieces as badly as the preceding. Unfortunately the teeth from the several jaws were not kept well separated in removing, packing and unpacking them. As I was not present when the remains were removed, I am unable to say fom personal observation which teeth belong to this specimen. I am assured by Mr. Heusinger, however, that a certain peculiar tooth in our collection was taken from this jaw. The crown of the tooth is identical in structure with that of the last molar already described; but this specimen has no roots; moreover, it is comparatively small, and its enamel is not well matured. A tiny tusk, one inch in diameter, was also found in this jaw (Plate IV). Here is sufficient evidence that the animal from which the jaw was derived was not yet adult.

4. Part of a lower jaw formerly exhumed in the same spot as the preceding specimens, and presented to the society by Dr. Glaser. The bone of this fragment is firm and well preserved. The teeth have been removed, but we possess what are evidently parts of the two last molars of the jaw. At the front end of the specimen can still be seen a part of the socket of a small tusk, 2 inches in diameter.

5. The upper end (18 inches in length) of a thigh bone. The material of this specimen is fairly well preserved. Possibly the bone could have been removed whole if all of it had first been uncovered. The greatest diameter of this specimen is 13 inches; its circumference 12 inches from the upper end is 30 inches.

6. Fragments of an acetabulum, or socket that receives the upper end of the thigh bone. This was exposed on the west



A ledge of calcareous sandstone, showing ripple marks.

side of the excavation, next to the bottom, showing that a pelvis lies buried there.

7. Two rib fragments, being the ends of two ribs, each 11 inches in circumference.

8. A vertebra, presumably of the tail if derived from a mastodon, as it is small, its centrum measuring only 3 inches in length.

EXTENT AND VALUE OF THE DEPOSIT.

Before forming an opinion as to the probable extent of this deposit of fossils, we should study the geological history of the locality. The superficial stratum of the pond is a black waxy earth, rich in organic matter. At the point where the fossils were found, this layer has a thickness of about 7 feet. Underlying it is a stratum of grayish clay, two feet thick, in which the fossils are imbedded. Then comes a layer of gravel, several inches deep, containing specimens of Exogyra arietina. This, in turn, is followed by a light-colored clay.

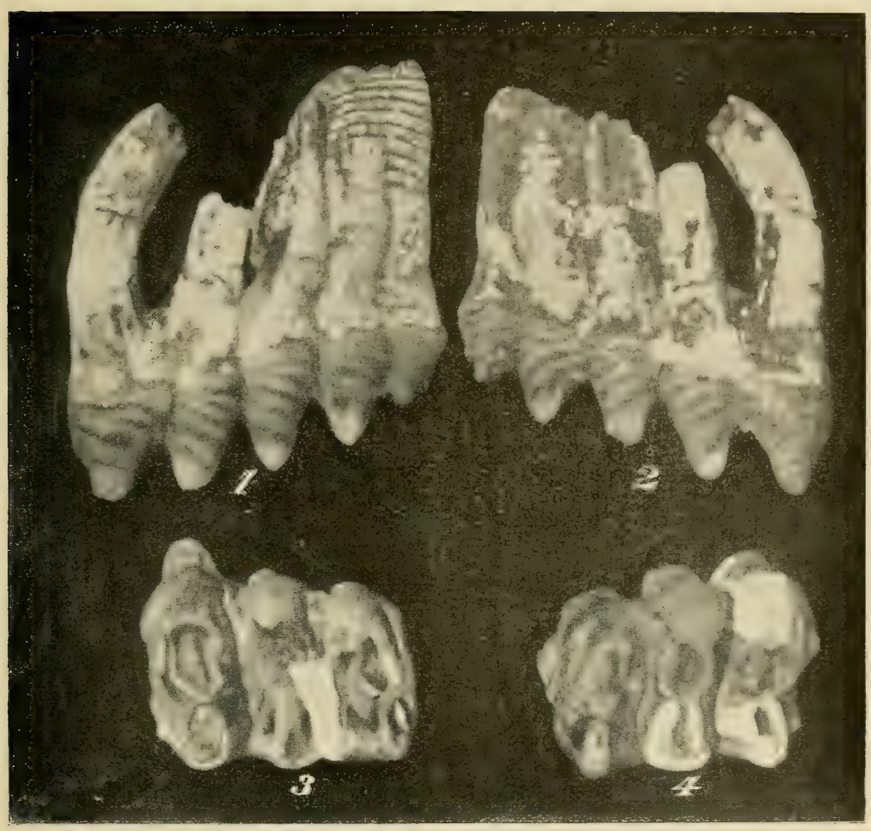
The facts observed, together with the reasonable supposition that the climate of this region was formerly more humid, lead me to think that this depression was at one time much deeper, and was then occupied by a small lake or marsh, and that it has been slowly filled with wash deposits from the higher ground surrounding it and with the products of animal and vegetable decay. When mastodons frequented the region, they were probably attracted to this spot by the presence of water or food, occasionally perishing by becoming mired, or otherwise. Their bones sank into the mud at the bottom; and as the lake was slowly filled, the remains became more and more deeply imbedded, until now they rest eight feet below the surface. The dense, damp clay, effectually excluding the air, has for these thousands of years kept the remains in a fair state of preservation. The ordinary bony material of the specimens has not deteriorated since these were exhumed, while the cement and dentine show a tendency to crack and crumble, necessitating repair.

A question of great interest, and one often asked, is, How long since these huge beasts inhabited the earth? To this question geologists can give no definite answer in terms of years. They tell us, however, that the fossils of the mastodon in America are found only in the later Tertiary and in Pleistocene deposits. The most recent species, *Mastodon giganteus,* survived to a late Pleistocene period. There is some evidence that this huge mammal was a contemporary of early man. As to the age of our specimens, I can only say that thousands of years must have elapsed since the individuals that possessed them roamed over the plains of western Texas.

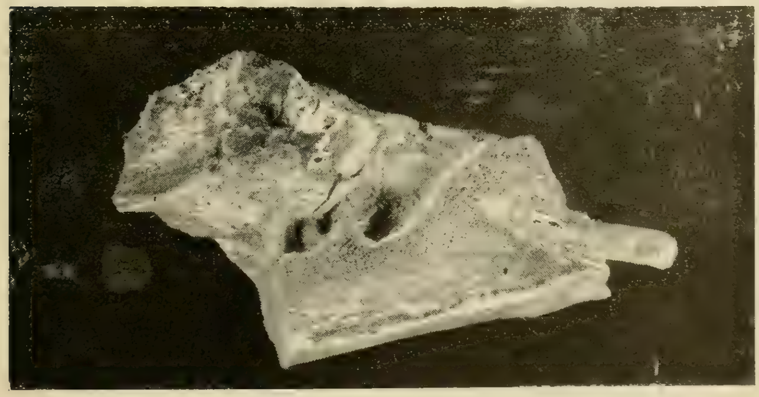
As has already been shown, there were found in a circular area but five feet in diameter, remains of at least three mastodon. In view of the facts already given, it is reasonable to suppose that we have here a fossil deposit of large extent, possibly as rich as that of Kimmswick, near St. Louis, where in a limited area bones representing several hundred individuals have been exhumed. The correctness or fallacy of this view could be established by sinking test holes at several points in the depression.

SOME SUGGESTIONS AS TO FUTURE EXCAVATIONS.

I have some suggestions to make as to the mode of procedure in case this society (or other organization) should decide to make further excavations. First of all, some arrangement would have to be made with Mr. Brucks to secure the right to make excavations on his property. This having been done, it would be well to engage that gentleman, or through him some one in his neighborhood, to remove the earth about the old excavation nearly to the level of the fossils. This work should be done with a team, plow, and scraper. These preliminaries would not require a visit to the locality. The organization could then send a representative to carry out the excavations proper. This person would have to procure several laborers, some boxes (or lumber for making them), packing, plaster of Paris, a camera, etc. He would also have to make arrangements for board and lodging for himself and, if necessary, for his assistants. Two or three days' work should enable the party to make many interesting finds and possibly even startling discoveries.



The four molars from the lower jaw of a full-grown mastodon.



Fragment of lower jaw of young mastodon, showing small tusk.

ORIGINAL OBSERVATIONS, WITH PHOTOGRAPHIC ILLUSTRATIONS, ON REPTILES AND INSECTS OF TEXAS.

BY R. MENGER, M. D.,

READ BEFORE THE SOCIETY, OCTOBER 11, 1904.

Mr. President, and Gentlemen of the Scientific Society of San Antonio:

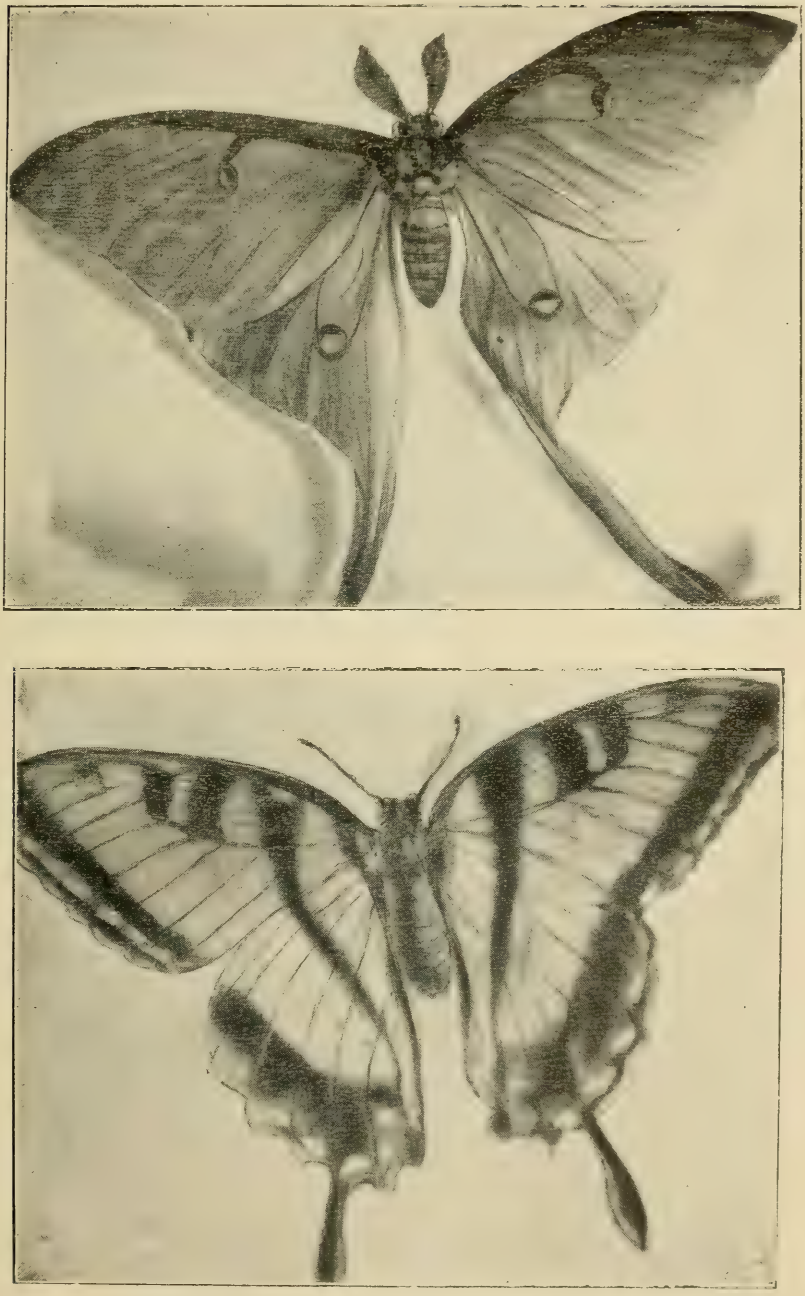
Some time ago I noticed in the local press that it was the intention of your society to prepare a collection of objects interesting to science and natural history, and, as I had a number of original photo plates illustrating such subjects, accumulated during many years, it occurred to me that these plates could be utilized to advantage by your honorable society. Accordingly, through the kindness of Dr. M. J. Bliem, the plates were printed and the copies were mounted in the form of three separate charts—two representing photos of divers animals and insects indigenous to our Texas climate, the third chart representing microscopic objects, prepared by the photo-micrographic process, which, perhaps, will be discussed, specifically, on some future occasion.

Our Texas insects, particularly those of the venomous type, furnish a great field for scientific research, and in a short review such as the one now to follow, of course only a few of the more important objects seen on some of the charts can be considered.

Among the most harmless of insects, our Texas butterflies abound in manifold species and luxuriant colors, and those on the chart represent only a few of the more interesting species, reproduced in natural size and colors. They were all prepared, shortly after capture, on a 4x5" plate with extra lens appliances to camera, short focus and lamp-light exposure. Most of these specimens were obtained from the forest valley of San Geronimo, about 28 miles northwest of San Antonio, and some of these specimens are very rare and exceedingly difficult to capture.

Among the other views, an interesting group of prairie hawks is represented exactly as the hunter has seen it, in the wilderness around Mitchell's Lake. These hawks were after a large bull snake which was twisted around a dry and hollow tree, seeking birds. This group was procured and mounted by the late L. Toudouse, who, next to Prof. Jermy, was one of the ablest taxidermists Texas ever had. Mr. Toudouse had a splendid collection of all conceivable wild animals of Texas, and his mountings were sought, not alone here in Texas and up North, but in Europe as well, where they still decorate some of the large cities' museums. Mr. Toudouse and his sons killed most of his specimens in Bexar, Bandera and Dimmit counties, at a time when Texas was still abounding with a great variety of wild animals and birds of prey. The larger portion of the most diverse and beautiful specimens of water fowls and wild animals in Toudouse's collections of Texas zoological specimens were killed around the famous Mitchell's Lake, which is still the hunting paradise of local Nimrods. He mounted his specimens in just such postures as were seen in nature during his hunting trips. Entire quail families from the youngest to the full grown, some on nest with the young peeping out; large groups of the feathery prairie tribe; wild animals of prey; aquatic fowls and enormous reptiles of either rare or common species, he prepared in lifelike posture, and when I visited his villa some twenty years ago, I prepared a number of fine photo reproductions, but, alas! nearly all of them have been loaned out or lost, else they would now, perhaps, be decorating these walls as a valuable acquisition to this, the San Antonio Scientific Society.

In glancing over the charts submitted, a few of the more interesting objects may be mentioned; for instance the scene at a Rockport fishery, showing a number of man-high so-called "silver kings," caught in the Gulf. Another and rare view is noticed in the center of the same chart—a huge rattlesnake in the act of devouring a bush rabbit. This is an unusual and interesting scene.



Rare types of Texas Lepidoptera.

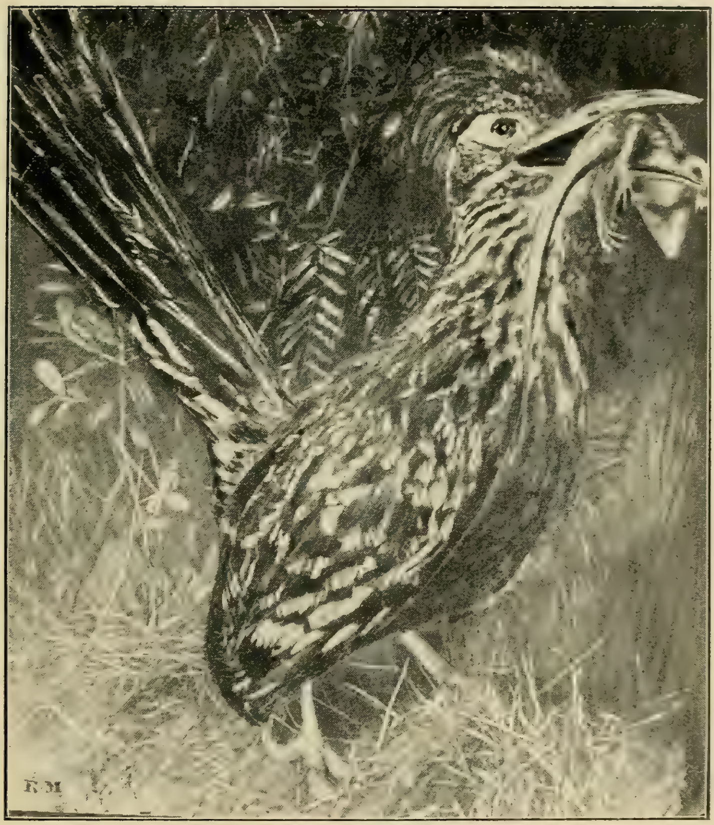
During a hunting trip a few years ago, in company with Dr. Withers, at the Leona, nine miles west of San Antonio, we came across a monstrous-looking rattlesnake, loudly rattling its erect tail, and in its large open mouth it had a full grown cotton-tail rabbit, swallowed up to the shoulders. The reptile lay fully stretched out in an open space between jungles of cacti and Spanish dagger plants, its rattling tail elevated high up from the ground, and its eyes glittering fiercely. At close range we shot this reptile and put it in a box which we happened to have along, and in coming back to town a photograph of the snake, with rabbit still in its mouth, was taken, just as seen in this photo collection. Besides this the snake had two prairie rats in its abdomen, noticed when Dr. Withers had the skin of the snake prepared by a local snake dealer. It is a beautifully striped skin, of the *"Crotalus adamanteus"* species, I believe, five feet long. I will take pleasure in showing it to you afterward.

Regarding the peculiar "warning signal" of some poisonous reptiles, especially the *Crotalidae,* it is not universally known, not even by some of the expert naturalists, that the female reptile especially in approaching danger, warns its young offspring to seek shelter in the mother's mouth and throat! But such is really the case—in the rattler as well as in the moccasin snake. I am in possession of an interesting letter from a renowned English naturalist and author on "serpents of England," who wrote to me the following lines some years ago:

> "Probably you have heard that in those regions of England where the adder abounds, the people there positively claim that the adder mother swallows its young during approaching danger to protect them. But to my own knowledge this has never been verified, nor have I had occasion to prove it through others. Lately, though, some newspaper article of yours came into my possession in which this was actually observed in the rattlesnake. I would thank you very much for further information; as far as the adder is concerned, it never has been proven."

This letter of Prof. G. Leighton (of Grossmont, England) I answered with the remarks that not alone the crotalus, but also the moccasin species, and perhaps others, warn their young of approaching danger, and that it also is not generally known, even to some of the scientists, that the rattlesnake mother is not an oviparous reptile, but that it breeds its young alive into the world, and that this has been observed by Prof. Jermy at our San Pedro Springs Museum of Natural History and Zoological Garden; and, in order to verify my statements more explicitly regarding the protection of the young tribe, I answered Prof. Leighton that a trustworthy friend, Mr. E. Raba, of San Antonio, during a hunting trip along our romantic San Antonio River, near one of the old Spanish missions, came across a pair of large moccasin snakes. These snakes, as is well known, give no danger warning like the rattlesnake; they lay seemingly dormant, coiled up near the water's edge in some depression of the ground or weedy place, and the unwary pedestrian is very likely to step on one of these reptiles and get bitten. Mr. Raba quickly killed one of the snakes, and noticed to his surprise that numerous small snakes crawled into the mouth of the other snake. After killing this one, for mere curiosity's sake, he opened the now swollen snake's body with a pocket knife and removed eighteen young moccasins from the mother's throat, each measuring about 8 inches. In regard to our Texas rattlesnake, I answered Prof. Leighton's letter with the following now historic event of my old friend, John Wickeland, of the Martinez settlement, some twelve miles east of San Antonio, which event is, of course, absolutely trustworthy, as Mr. Wickeland (a wealthy stockman and farmer) is one of the best known gentlemen in Bexar county. Mr. Wickeland wrote to me as follows:

"Answering your letter, I can state these facts: Some fifteen (now eighteen) years ago, while driving cattle with my German neighbor, Mr. Alf Real, we stopped at a hilly region to put up our camp and prepare dinner. Whilst I was engaged in gathering kindling to start a fire, I noticed how a number of small snakes suddenly disappeared under a pile of dry brush and leaves. At the same time I heard the warning rattle of a rattlesnake. We set the brush and leaves on fire and awaited further developments. It was but a short while till two large rattlesnakes came out rattling, and Mr. Real killed one of them and myself the other one. Ultimately a third rattler made its appearance, which we also killed. All three snakes were not very long but of unusual thickness, and for this reason I concluded to cut them open. During this procedure we found that the first rattler harbored eighteen, the second one eight, and the third one twenty-two young rattlesnakes, all of the same



Texas Chaparral Cock or Road-runner (with a lizard in its beak).

length as the ones I had seen shortly previous escaping under the brush and leaves. All had one rattle at the tail end, and they tried to bite us or escape, but we killed every one of them.

"At another time when I was engaged in the sheep business and herded a large flock myself, I often met a number of rattlesnakes. And it was while herding one time that I encountered an unusually large specimen spread out on the prairie. It was apparently asleep, with numerous young reptiles surrounding it. It noticed my movements and began rattling fiercely, and, with its mouth wide open, I noticed how all the young snakes rapidly entered and disappeared inside the old snake's mouth. After killing and dissecting the old snake, I found the young ones alive and of same size as those I had seen shortly before."

The above data are the more interesting, as some time afterward I related these facts to a local snake dealer and received from him the astonishing answer that among some forty thousand specimens of all the snake species handled during the last five years, it had not occurred to him once that the rattler or any other kind of snake paid any particular attention to its young. This may be explained, it seems to me, by reason that these reptiles are confined so closely in wire cages that they instinctively feel safe, and do not impart such warning signals to their young as those in the open air during pending danger. How else could it be explained?

Another interesting scene of this photo collection is our road runner, or chaparral cock, with a lizard in its beak. It is claimed these useful birds also kill snakes and other reptiles, but their main food consists of lizards and insects. I have seen one with a young prairie rat in its beak, out in the hills of Helotes, near the road. This photo was made shortly after capture. I may state in connection herewith, the chaparral cock is a typical Texas prairie bird, and belongs to the cuckoo family. I have absolutely no literature on this interesting bird, and I will quote from memory a few peculiarities of same. It is about the size of a full-grown chicken but of slender and imposing stature, with long neck, feet and tail feathers, of beautiful greenish dark blue plumage, with white feathers along its body and wings. It has a strongly developed, pointed and slightly curved long beak with which it attacks its prey, especially lizards and young snakes, and all sorts of insects, young rats and mice, etc. It roams all over the Texas plains, and wherever the hunter goes, in hilly regions as well as valleys, in forests, pastures, chaparral or in prairie regions devoid of chaparral—everywhere, it seems, this unique bird of prey is encountered—in particular, though, in dense chaparral and hilly regions, and along the roadsides; therefore its name, *chaparral cock,* or *road runner.* In droughty seasons it undoubtedly destroys numerous snakes and other varmints, besides lizards, which are its principal food. Its speed is so great that it takes a good horse to keep up with a chaparral cock when running along the prairie roads and trails, and generally this bird gets easily out of sight by dashing into the dense chaparral or flying swiftly along a hillside up into a tree. It rarely flies, though, and only a short distance above ground, in a straight line; or it jumps upon the nearest branch of a bush or tree, and quickly hops further and further until it is seen high up in a tree. I have thus seen them often in mountainous regions far up on a high tree above rocky cliffs, and it is a beautiful sight to see the bird thus high up with its long neck erect and perhaps a younk snake or lizard in its beak.

The chaparral cock should be protected by all means, as it destroys a vast number of varmints. Some foolish hunters, especially boys, shoot them—"merely to have something to shoot at," when the bird is left on the prairie to be devoured by buzzards, hawks, or cayotes. There is absolutely no reason for shooting these, as well as so many other useful birds, inasmuch as the meat is said to be very tough and not in any way palatable as is the case with game birds.

The chaparral cock prepares its nest in some dense thicket, usually in a persimmon tree, in the midst of the chaparral, consisting chiefly of dry branches of mesquite and other woods, the inside of the nest being only sparingly lined, covered with dry grass and sometimes with moss, cotton, etc. The nest is usually built only a few feet above ground, the female laying a number, perhaps eight to ten white eggs, about one-half the size of a chicken egg. The young are covered for a long time with furlike feathers, and they are nourished with all kinds of insects, especially grasshoppers, beetles or lizards, young snakes and mice. Quite soon these young leave the nest, when they also are endowed already with quick speed in running. They all make a peculiar rattling noise—produced by opening and closing their beak in quick succession, and the hunter often gets alarmed, when the chaparral cock is not seen—believing the rattling noise to be the warning signal of a rattlesnake, which it closely resembles.

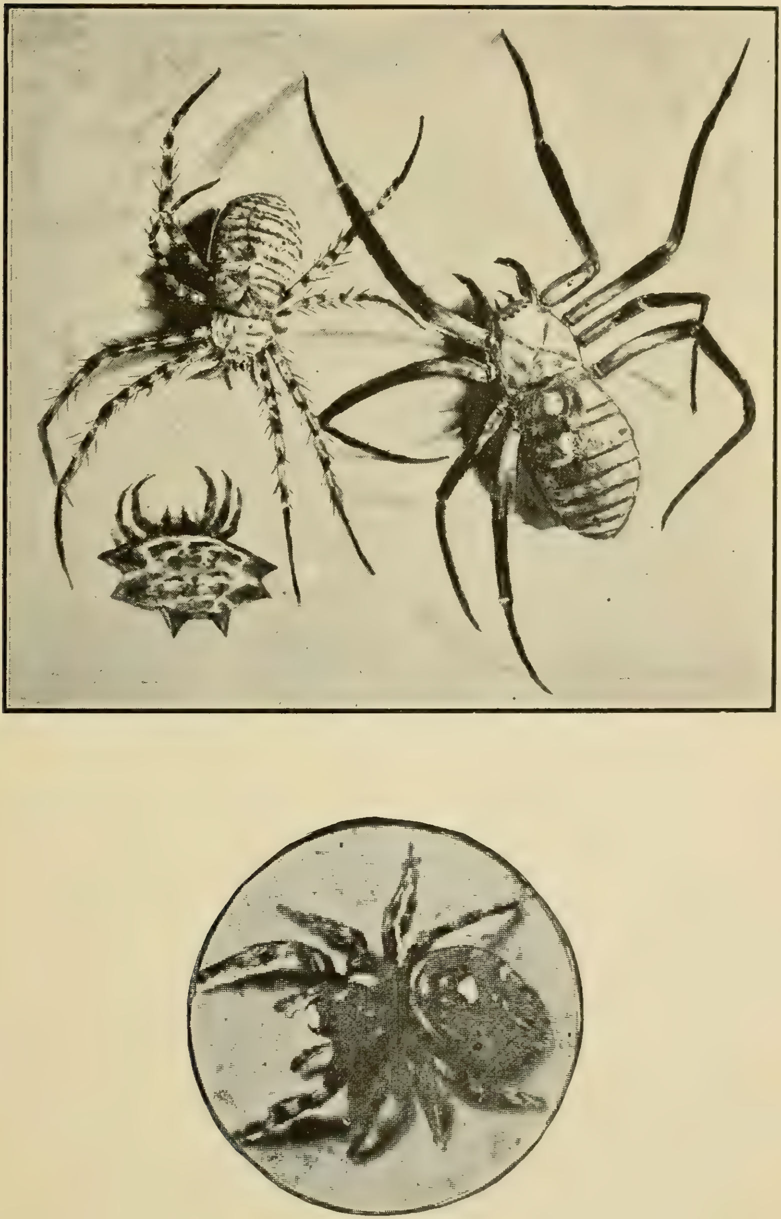
The law allows the killing of birds and wild animals strictly for scientific purposes, and the present game laws are doing an immense amount of good in preserving the rapidly diminishing game in Western Texas, and at this time of the year the fields and valleys again abound with plentiful small game, such as quail, wild doves, rabbits, etc., which in former years were slaughtered wholesale, even during breeding time.

As to reptiles, I included in the photo collection a few of the more important species—the rattler and the moccasin snake. The multi-colored kingsnake and the so-called mousesnake, seen on the chart, were captured at San Geronimo; one in a beautiful forest valley, and the mousesnake in a cotton field.

The photos show these reptiles in natural size and colors. Two of the illustrations show the poison fangs of a rattler and a moccasin snake, mechanically exposed. As is known, each poison fang, i. e., the main, fully developed fangs, are situated in the upper jaw, covered by a broad membranous lining, and communicating with the poison glands, which contain a teaspoonful (more or less) of a most poisonous fluid resembling somewhat egg albumen. During the act of striking and penetration of the sharp and slightly curved fangs, the poison bladder is contracted by means of its muscular arrangements, and the poison ejected through a delicate canal which traverses the center of each poison fang and ends near the point of the tooth in a grooved outlet. Now, in order to expose the fangs, as seen in the photos, the covering membrane must first be retracted, as during lifetime, the fangs are nearly entirely concealed by this membrane; however, during the act of penetrating into the flesh it is fully retracted—even up to the base of both poison fangs. The poison symptoms will depend entirely upon whether a fang penetrates superficially only or very deeply, or lacerates some blood vessel. Therefore not all rattlesnake bites are fatal. Often the tooth breaks off during the striking act, or it penetrates thick clothing, boot or shoe, etc. Fright during the sudden meeting with a rattlesnake, with the blood-curdling "hiss" of its rattles and the consequent shock upon the nervous system and heart-centers, is liable to produce serious consequences, and even death. When a rattler strikes, its fangs are put in a much more erect position than is seen in the photo of a rattlesnake head with partly opened mouth, and at the same time the lower jaw is relaxed and hangs down so that the rattler can strike its fangs even into a curved or flat surface; for instance, the palm of a hand. My attention was called to this fact, through correspondence, by W. J. E. Kay, a prominent lawyer of Graham, Young county, Texas, who has had considerable personal experience with the venom apparatus of the rattlesnake.

In the fall, from September to November, the rattlesnake is encountered oftener, and when it is considered most dangerous, because during this season the reptile is more active in seeking its food for its long winter sleep—which it generally performs in deep holes or cracks under the ground or in hollow trees, especially such as are close to the ground, and they prey upon and devour an astonishing number of prairie rats and mice and birds—even the large chaparral cock, and also rabbits, with preference for prairie rats and cotton-tail rabbits. Where plenty of quail and wild doves abound, the hunter, and especially the younger generation of hunters, must always be on the lookout, lest he may step, in some weedy or bushy place, or along a cow trail, on such a reptile, or be alarmingly scared through the sudden encounter and the blood-curdling rattle. The experienced hunter is generally prepared for such an encounter, and he rarely gets alarmed, because a quick shot rarely allows the reptile time to strike, and its jumping capacity is rather limited, and under no circumstances, if there be the least chance to kill such a snake, should it be allowed to escape. In my younger years I killed some of these beasts with an ordinary stick or with a buggy whip.

Luckily, Texas has been greatly cleared of venomous reptiles and obnoxious varmints of all sorts during late years, due to the rapid upbuilding of its vast territory of over 274,000 square miles, and also to its many hunters with modern guns, to animals of prey, and also and in particular to professional snake hunters who sell the snakes to reptile dealers. Vast numbers have thus been made harmless, which otherwise would have roamed about and multiplied immensely. Local reptile dealers



Types of Texas Spiders.

therefore are doing a good work in encouraging this capture and destruction of reptiles and other venomous animals throughout the state and in particular in Bexar county.

Among the other interesting reptiles and insects on this chart may be mentioned the large black tarantula and a smaller species, the so-called jumping or privy spider, and also a peculiar and very venomous insect resembling somewhat an ant (if such be magnified several diameters). I have not been able to trace the true nature of this insect in any work on natural history. The body of this insect is elongated and of oval shape. Its abdomen is covered with intensely yellowish-red hair. It has no wings. At the end part of its body a large curved sting is seen which the insect retracts into its body and suddenly again expels when in the act of stinging. It must be very poisonous, for when I chloroformed it for the purpose of reproducing it by the photomicrographic process it accidently stung me in the finger—only slightly, but the pain was excruciating, similar to a red ant's or scorpion's sting. I have no direct observation, but believe it uses this weapon to kill other insects, perhaps tarantulas, wasps and other equally harmful insects. With the exception of its oval-shaped reddish-yellow abdomen, the balance of its body and its feet, head and antennæ are jet black. It is a great runner, and I have encountered it only in roadways.

The photo reproduction of the small white-spotted and black jumping tarantula, seen in our collection, is a fine and life-like illustration. I procured it by pouring a few drops of chloroform on its body, when it became at first very vicious, but gradually intoxicated. Then, with the aid of an insect forceps, I placed it on a glass plate previously smeared with Canada balsam, so that it would adhere well. After this I exposed it at close focus to the camera, magnifying it about twice its natural size.

Our Texas climate conceals a great variety of so-called prairie tarantulas, among which the jumping spider is very conspicuous—from the smallest, hardly visible variety up to the common gray and black tarantulas, from three to six inches long. Along our river banks a peculiar long-legged gray water tarantula is often met with, and in the days gone by, when our river banks were lined with old dilapidated bath houses and privy houses, instead of bananas and fine shrubbery, the water tarantula and the privy spider were very numerous, and when disturbed these large water spiders would run or jump over the water surface from one end of the bath house to the other.

Our prairies abound with most diverse species of spiders of different types and colors. At this time of the year, in fall, hunters and lovers of nature often come across some very beautifully striped prairie spiders, and perhaps meet some large spider webs suspended several feet apart from one branch or bush to the other, in the midst of which a beautiful yellowish-black striped spider from three to five inches long can be noticed.

Insects falling prey to spiders are quickly entangled in this web and later on are carried into the deep-seated spider houses, usually situated at the bottom part of a tree, in holes in the ground or between loose bark and rotten wood, in forest bottoms. The complex eye-lens of spiders, and in particular of the jumping variety, is exceedingly acute; they will trace a fly or other insect many feet off, sneak slowly toward the object, and, with a sudden jump, many inches off, they grab the insect, inoculate it and draw their nourishment from its body. Some spider species, and the speckled jumping or privy spider in particular, are venomous, and the medical fraternity could cite numerous grave instances of spider venom inoculation, even instances of death from such.

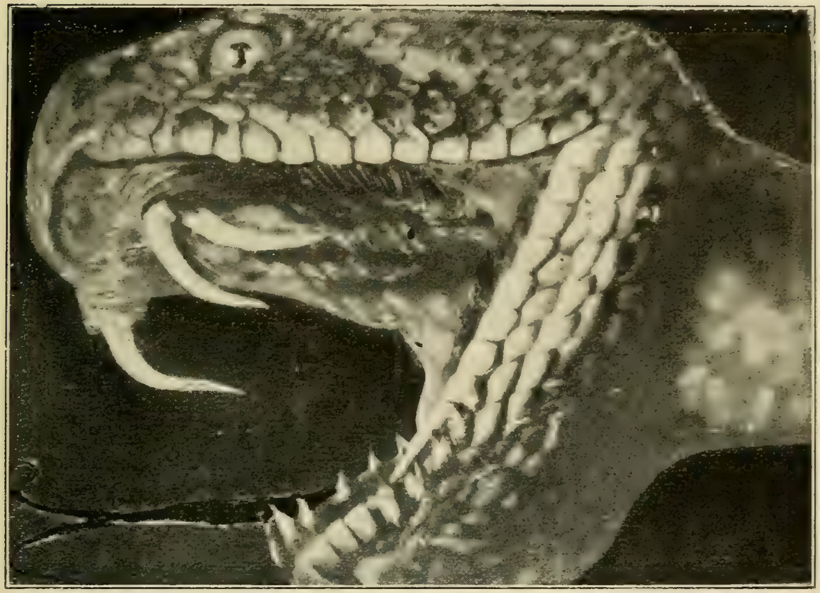
The centipede shown on this chart is of a very poisonous variety. It was a young specimen about one-third the size shown in the photo reproduction. Like so many other Texas insects of a similar venomous nature, centipedes now-a-days are becoming exceedingly rare, whilst formerly, when San Antonio was a mere frontier town, they were encountered very numerously, especially in crevices of old adobe houses, under cedar posts, rotten wood and lumber, etc. Why they are called "centipedes" is rather a puzzle, and certainly it is a misnomer, as they have instead of a hundred only forty-four legs, besides the large curved tail-end fangs and the fangs of the head part. Similar to other poisonous insects, the centipede conceals separate glandular poison canals near each claw, and in particular in its large tail-end fangs, from which, during the stinging act, a poisonous fluid, of the nature of hydrocyanic or Prussic acid, is secreted and inoculated into the tissues lacerated. During the lifetime of this particular centipede seen on the photo col-

Texas Eagle with Prairie Snake in beak.
(From Toudouse's collection of Texas wild animals.)

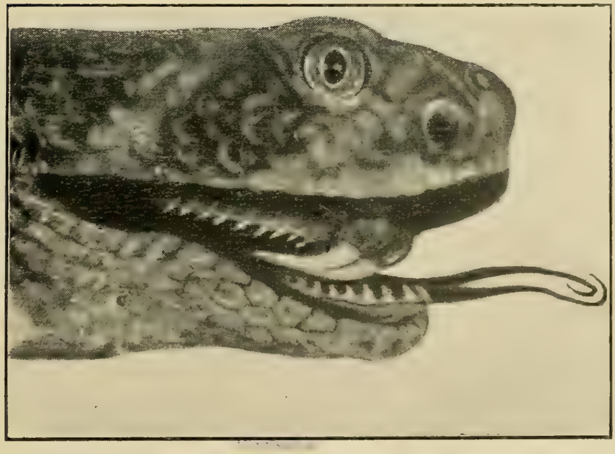
Boa-Constrictor, nine feet long, live speciman at San Pedro Springs Zoological Garden.

lection, the insect's main jointed body was of a dark bluish-green color, and its feet or fangs of a yellowish color. Shortly before death, however, the entire forty-four legs, and in particular the large tail-end fangs, assumed a deep indigo blue and peculiarly glittering color, caused perhaps by decomposition of the venom. Cases of death from centipede bites are on record, but I have never heard of an official death report from such cause in Texas. However, lately a fatal case of centipede bite has been reported in the daily press as having occurred in a Texas town, in a girl of 18 years, bitten during night time in the upper lip, and causing death under symptoms similar to such as are caused by the sting of a centipede. However, it seems that such insect was not seen, and the question is open as to whether it was not caused by some variety of poisonous spider. The lips are supplied with very numerous capillary vessels, and therefore they are liable to absorb such inoculated virus quickly into the general circulation of the blood, and for such reason the venom of such, or other animals, acts much more severely and quickly, even causing death, than if some other part of the body had been inoculated. The centipede generally causes a severe stinging puncture, discoloration and rapid inflammation (in a circular area) around each puncture of its sharp claws, and later ulceration and gangrenous sloughing, similar to a snake bite, sets in, and such ulcerations are often very tedious to heal. The sting of a scorpion is even more severe than that of a centipede, but is not as lasting, and with much less continued inflammation and other consequences. It is interesting sport to note a duel between a centipede and a mouse, and an amusing incident may be recalled here. Many years ago Mr. Adolph Dreiss had a large centipede and two living mice in a glass jar under observation at his drug store, and it happened that as soon as one of the mice came near the centipede a fierce battle ensued, and after several fruitless efforts the centipede ultimately enwrapped the mouse with its sharp claws and rolled around until the mouse was dead. With the other mouse, though, it happened that the battle was reversed. This mouse, with a sudden jump, caught "his honor," the centipede, around the neck and bit it clear through, whereupon the centipede was moribund.

Regarding Texas reptiles again, a few other remarks and observations may be added whilst the opportunity presents itself at this meeting. Among the misinformed and superstitious a great deal of ignorance prevails in regard to serpents, the venomous species in particular. The greater majority of snakes in our climate are harmless, and not alone this, they are useful creatures, as they live on all kinds of varmint, such as rats, mice, frogs and toads; also birds, rabbits and all sorts of insects. Still, to those not familiar with serpents, it is always advisable to be on the safe side and kill any and all snakes encountered. Owing to our warm semi-tropical climate, and a vast and in part as yet unsettled territory, in secluded and favorable regions, Texas still harbors quite a variety of different species of serpents, but the dreaded dangerous species, such as the rattlesnake, moccasin and copperhead, have considerably diminished in Texas of late years. Regarding certain species, scientists seem to be in doubt as to whether the multi-colored, so-called "kingsnake" or coral snake, is of a dangerous type; some claiming that the *saliva* of this as well as of all other snake species, is poisonous. (Compare Transactions of the Texas Academy of Science, Vol. V, p. 22 *et seq.*) I am inclined to believe this is true to a degree only, and it is a well known fact that not all snakes impart such deep-seated and dangerous inoculation wounds like those species especially supplied with large grooved poison fangs, communicating with extra poison sacs concealing the deadly virus. As alluded to before, the poison symptoms from snake venom intoxication depend on certain circumstances: first, the length of time elapsed since inoculation; second, whether a ligature has been at once and properly supplied; third, whether the fangs had penetrated only superficially or deeply into the subcuticular tissues; fourth, whether the parts bitten are rich in blood vessels and lymphatics, and whether or not these had been lacerated; and lastly—fright! which is often wholly unwarranted, some persons fainting or getting hysteric by the mere sight of an innocent snake. The venom of all poisonous animals, especially such of serpents of venomous type, acts directly or indirectly upon the heart and nerve centers as a great depressant; therefore stimulating remedies, as ammonia, strychnine, nitroglycerine, alcohol and a new remedy, adrenalin, are employed to stimulate the heart and nerve centers, and retard the paralyzing effect of the venom



Head of Texas Rattlesnake, showing poison fangs magnified one-third.



Head parts of *Crotalus* Durissenus Texensis, normal size, mouth
opened showing position of the curved poison fangs,
the upper and lower jaw teeth and adnexa.

and allow the secretory organs, the liver and kidneys, to eliminate the poison gradually through the kidneys and sweat glands—stimulated by using diuretics and large quantities of saline enemas, etc. As to local applications, permanganate of potassa, carbolic acid or iodine, properly applied, have the most rapid action; also hot poultices afterward, as indicated.

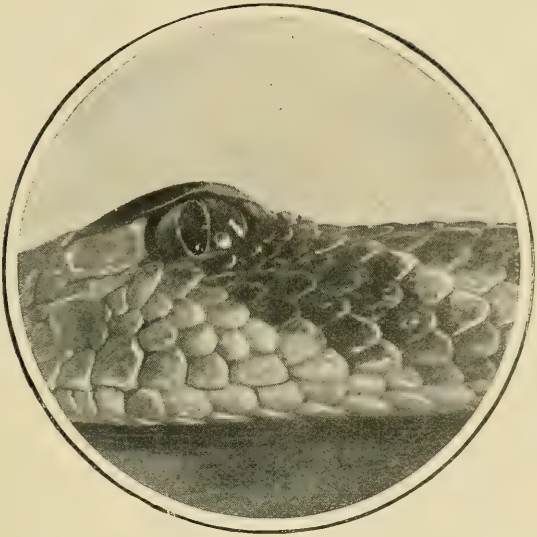
Regarding a remedy for *immediate use* in snake bites of any kind, I would advise the following: The hunter, or farmer, etc., should carry with him on his hunting trips or in the field, a small box containing permanganate of potassa (which any drug store has for sale). When bitten, locate at once the fang wound above and close to the wound; cut it more open with a clean knife, and rub some of the potassa crystals well into the wound; if it bleeds freely, the better; also cover the wound with the salt, apply bandage over this and seek your physician as speedily as possible. In nearly all cases thus treated there will be but slight venom intoxication and consequences, but you must act quick in applying a bandage tightly over the wound, and *thoroughly* rub the potassa salt in the wound. Apply later a warm poultice, if any swelling should occur.

It is now well known to naturalists that serpents are either *oviparous* (egglaying) or *ovoviviparous,* comprising those species which give birth to their young. The eggs of the oviparous genera have a thick and hard calcarous shell, whilst the eggs of the species producing young alive have but a very thin and delicate covering, which ruptures shortly before or during birth of the young. This process is similar to the breeding habits of some fish species, and it is unknown to some naturalists that, for instance, our smallest fish species, the Texas minnow, is an ovoviviparous animal. If during the breeding time, which seems to continue all the summer, a female minnow is captured in some of our creeks or tanks, and put in a glass of water and left there a certain length of time, it can be noticed how the young minnows are gradually born alive, and if the abdomen of such fish is opened a large number of more or less fully developed and living fish embryos can be noticed inside the delicate egg membrane, and, if some of the more mature of these are put in a glass with water, it will be noticed how they at once wriggle and merrily swim around in the glass.

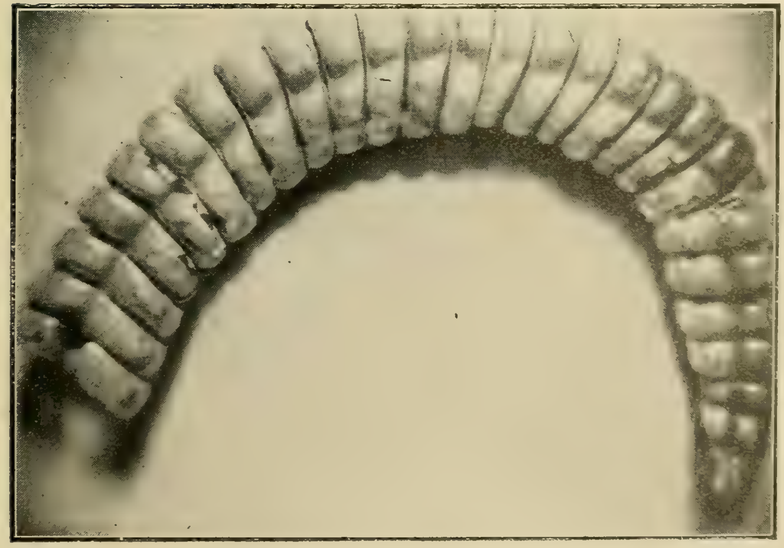
In the Crotalus family, the young snakes are quite vicious shortly after birth. I encountered a very young rattlesnake some years ago along a ravine at the Leona, which was only nine inches long and very vicious. It was found rolled up, and was beautifully striped, and on disturbing it, it showed signs of fight at once, waving its tail upwards and striking viciously at the stick held near its body. After killing it, the two main poison fangs, resembling a cat's claw, were found to be fully developed.

Regarding the habits and peculiarities of the kingsnake (Elaps fulvius) the specimen seen in our photo collection was killed in the valley of San Geronimo, northwest of San Antonio. It was beautifully striped with vermillion red, jet black and orange-yellow colors; was about two and a half feet long and void of extra poison fangs after examining its mouth parts. Perhaps some particular species of that beautiful snake are supplied with grooved fangs, and are more dangerous than others of the same genus. I recollect that many years ago a professional friend of mine, the late Dr. O. Grube, of New Braunfels, related a fatal case to me of a boy who was bitten by one of these coral snakes and I find in the report of the Smithsonian Institution, U. S. National Museum, by Prof. Edward D. Cope, the following valuable notes in the chapter relating to Elaps fulvius: "Few people know or believe that it is poisonous, it looks so harmless, and as a consequence they catch it and handle it rather roughly; the snake gets angry, bites, and a human life is endangered. I know personally of such a case. A Swede at Oakland, Orange county, found an Elaps, and because of its beautiful colors he caught it and tried to put it into a bottle of alcohol. The snake bit him, but the wound was not large, and as it did not swell, he did not care much about it at first. After a while he was taken very sick, asked for a physician, and drank whiskey, but it was then too late. He died the next morning, about twelve hours after the snake had bitten him. During the last hours he was unconscious, but before that he suffered most excruciating pains. I have heard of several other cases of boys dying from an Elaps bite."

In other cases people have been bitten by an Elaps fulvius without suffering from it in any way, but I suppose that in such cases the Elaps had not been able to inject any poison into the wound, as it has a rather small mouth. However that may



Eye-ball of Rattlesnake, showing the elliptical shape of Iris.



Rattles of large Rattlesnake. (Texas.)

be, I can not agree with Cope that the bite of the smaller ones (meaning smaller species of the Elaps) is innocuous to man and the larger animals. It is to be observed that the Elaps bite differently from the Crotalids and Viperids. The latter snake throws its head forward in striking, and draws it back again immediately. The Elapes fulvie I have seen and heard about acted in an entirely different manner. The poor Swede above mentioned had to pull the snake from the wound, and other specimens that I have induced to bite into sticks, kept the stick in the mouth for a good while. This habit probably signifies an intention to press as much poison into the wound as possible, which makes the snake the more dangerous. Elaps fulvius is, however, a good-natured snake, and it does not bite unless it is very much provoked. If not handled too roughly, an Elaps may be allowed to crawl on one's hands, from one to the other. I have allowed it myself once, but I hardly think I would do it again, and would not advise any one else to try it.

The many species of water snakes occasionally encountered in our creeks, tanks and rivers are often confounded with the genuine moccasin, which is equally as poisonous and even more treacherous than the rattlesnake, as it gives no warning signal. Our Texas moccasin is a rather small snake (not longer than two or three feet), with dark and rather thick body, lead-colored scales, piercing eyes, black and yellowish-white striped along abdomen, and it has a very broad heart-shaped head supplied with slightly curved and long poison fangs. The head part of such a snake, slightly magnified, is shown in our photo reproduction.

In the United States National Museum Report, Prof. Cope mentions: "Three species of this genus are known. They are snakes of robust habit and their bite is highly dangerous One is terrestial in habit and the others semi-aquatic. It extends from southwest Virginia to the Rio Grande, and throughout Florida. It ascends the Mississippi to middle Illinois and the Ohio to the Wabash river. It inhabits swamps and the borders of water courses, and catches fish with ease. It generally seeks the water when disturbed, and will turn on the pursuer when cornered. Its bite is very dangerous."

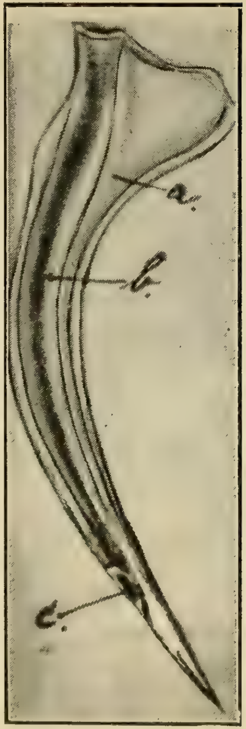
This statement that the moccasin pursues its victim, I can corroborate; in one instance, when a farmer was driven hastily and quite a distance to seek shelter in his farm house. That they are highly poisonous is attested by a friend of mine, who, some time ago, told me he had lost a valuable bull which was bitten by a moccasin whilst the animal was drinking water from a water pool in his pasture. A sad case of death from a moccasin bite was that of a young man a few years ago who was bitten in the hand and between the fingers while bathing in the San Antonio river. He was brought quite a distance in a semi-collapsed condition, and laboring under profound venom intoxication, to the City Hospital, where Dr. Clavin and myself treated him. The fingers and hand up to the shoulder joint were fearfully swollen, and gangrenous sloughing with exposure of the tendons and bone set in rapidly before he expired.

In Louisiana and other Southern States the moccasin is said to be the terror of the negroes about the rice plantations, being more dreaded than the rattlesnake, which strikes only when irritated. This snake's, as well as the rattlesnake's life, is very tenacious. Even when severed from its neck, the head retains its vitality for a long time. For instance, the head of the moccasin seen in our photo reproduction lived over an hour after having been severed from its body, and shortly before I prepared the photo, several yellowish and albuminous venom drops were ejected from both poison fangs. The snake's head, of course, was made harmless before the photo was taken. As to the vitality and viciousness of the rattlesnake, a case was related to me personally by a highly respected gentleman from Medina some years ago. A farmer of Medina, some twenty-five miles west of San Antonio, in plowing his field, came across a rattlesnake, and the plow happened to sever the snake in two parts. The farmer believing the snake to be dead, went on plowing, and, in turning back from the opposite end to the place where the plow had run over the rattler, he noticed something like a stick in his way among some weeds, and, in the act of picking it up he unfortunately seized the neck part of the snake. With a sudden strike the rattler plunged its fangs into the farmer's hand, and in less than five hours the man was dead.

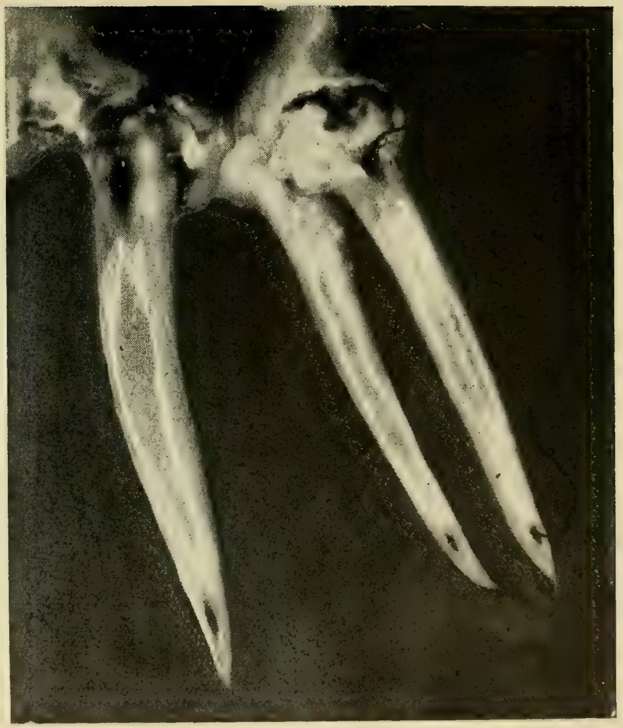
The peculiar anatomical, especially muscular, ligamentous and osseous arrangement of the serpent's mouth and throat part, enables it to crush and swallow animals many times the size of the snake's head. Entire full-grown rats and bush rabbits, and in several instances even full-grown jack rabbits, have been observed to be devoured by monstrous rattlesnakes. Mr. C. Hummel of our city related to me some time ago such an occurrence, as related to him by some farmer, and a German farmer from Medina also told me that he had met in his pasture a fearfully large rattler in the act of swallowing a jack rabbit. These are exceedingly rare observations, but a fact, and could only occur in very large rattlers. The average length of a rattlesnake is generally not more than three or four feet, as they are generally prematurely killed, but there are instances on record in which the killed snake measured up to eight and even more feet, and these are the ones liable to devour an animal the size of a full-grown jack rabbit.

It will be noticed that where such game as prairie rats and rabbits abound, the dreaded rattler is also very numerous. In Helotes, northwest of San Antonio, for instance, rattlers are very numerous in certain regions on account of the quantity of small game, whilst further north, in the more mountainous regions, around San Geronimo, where there is less small game (only a very few prairie rats and rabbits), the rattlesnake is a great rarity. This corresponds with the statement made by naturalists and others of countries where the prairie dog is at home. A very interesting history of such a "dog town and rattlers" is mentioned in Dr. Cope's classical classification work (Report of National Museum, Smithsonian Institution, 1900; from the pen of Dr. H. A. Brous, American Naturalist, Vol. XVI, page 565, 1882): "Prairie dogs (Cynomys Ludovicianus) seem to have a most intense dread of rattlesnakes. These little animals dread not alone its venomous bite, but also the loss of their young, which serve as food for these snakes that enter their burrows, take possession and drive them from their homes. Where does one find a prairie dog town but it is teeming with snakes, and the strange little owl that 'ducks' to passers in ludicrous solemnity? These do not constitute a happy family. The owls, though they generally occupy an abandoned hole or burrow, destroy the young dogs. Nor do the eggs and nestlings of the owl fare with any better treatment from the snakes; between them there exists much enmity. One afternoon while passing through one of these dog towns in Wallace county, Kansas, we heard a most unusual noise and stir (in the town) as though they were holding a bellicose council. They were collected around a hill, into which they were scraping dirt vigorously. On examining the burrow, it was found to contain a large rattlesnake, that the dogs were trying to entomb. I noticed this several times, as did other members of our party. To leave no doubt upon the subject, we dug out the snakes after shooting them."

I am very sorry, gentlemen, that this report already has trespassed the limits of your indulgence, but I can not refrain, before closing, from calling your attention to chart No. 3 also, which represents some unusual and very interesting objects. One of the photos shows the poison fangs of a rattlesnake very highly magnified, as seen in transverse section, with the poison canal and its exit near the end of the sharp-pointed fang. Another shows the peculiar warning apparatus or rattlers of a monstrous rattlesnake which had tweny-six rattles and a button. This interesting specimen was kindly handed to me by Mr. Menck, proprietor of the San Pedro Springs Museum and Zoological Garden, and this photo is, as seen, a most life-like reproduction and it shows what an enormous creature the rattlesnake must have been. The third photo shows the wide-open mouth of the European adder—Kreuzotter in German—showing the large poison fangs covered by a retractable and broad membrane, and the smaller supernumerary teeth of the upper maxillary bone. I reproduced this illustration from a drawing in Reichenbach's works on natural history. Photo number 4 is from a drawing in Gross' "System of Surgery," magnified several times, showing the complex muscles of the head and jaws, and the relationship of the poison bladder to its ducts and the fangs. Plate 5 represents the nine-foot boa constrictor at San Pedro Springs, as seen gracefully stretched out in its cage in a semi-circle. This is a beautiful and rare snake, non-poisonous, and alone worth the trouble to pay it a visit and study its nature. But one of the most interesting objects on this chart is the reproduction of the Gila monster, seen at our San Pedro Springs Museum. It is an unusually large specimen; unluckily in taking its picture at too close focus, the head outlines are not very plain. From long confinement, this veno-



Poison fang of Rattlesnake. (Magnified longitudinal section.)
(a) Pulp cavity of tooth; (b) Venom Canal;
(c) Outlet of Venom Canal.



Poison fangs of Rattlesnake. (Front view.)

mous reptile lies dormant in a corner as if in deep stupor, but it has its vicious eyes open, and when disturbed it easily gets restless and crawls lazily around the cage, constantly stretching its long tongue out like a snake. Its jaws, I am told, are supplied with a number of sharp teeth—its weapons of attack, and by which its deadly saliva is instilled into the lacerated wounds. When Mr. Menck disturbed it with an iron rod, it became very lively and showed none of its sleepy nature. This reptile has a very clumsy, broad body, supplied with a long, broad and spotted tail, and is of a peculiar reddish-yellow color, spotted with large and broad black spots, and resembles somewhat the intermediate appearance of a young crocodile, an enormous tadpole, or an immensely large lizard. It has four short, black-colored feet with five toes each, and its large and broad jet-black tongue is constantly expelled and retracted when disturbed. When the photo was taken, it was rather restless, and a time picture could not be taken in the rather dark apartment, but as soon as Mr. Menck fed it with raw eggs in a saucer, and after having taken several mouthfuls, the monster held its head high and remained steady enough during the act to allow a picture to be taken at close range, Mr. Menck watching it constantly with an iron rod in his hand.

The deadly poison, it is alleged, is contained in the saliva, which, after the teeth have lacerated the tissues, is rapidly inoculated. It is said the Gila monster kills the rattlesnake, a traveler having encountered such a monster in the act of chewing up the head and neck part of a recently killed rattler. Its home is in the rocky and mountainous regions of Arizona, and in particular along the Gila river, and it is considered there, and especially by the native Indians, as one of the most deadly of animals. I will read to you, gentlemen, the sad and terrible fate of a tourist's companion in Arizona, published in the Philadelphia Times in the year 1893, and reproduced in a medical journal:

"Florence, Arizona, June 22, 1893.

Richard M. Farthingay, a tourist from Minneapolis, returned here last evening with the remains of Arthur James, who had accompanied him on the journey, and who had died the day before from the bite of a Gila monster.

The story, as related by Mr. Farthingay, who seems to be utterly prostrated by the horror of the occurrence, is indeed a terrible one. It appears that following a blacktailed deer the two hunters found themselves near a small water course emptying itself into the Gila, and at last struck camp for the night on this creek. The weather proving rainy they sought shelter in a little cavern formed by a heap of rocks, taking the precaution to close its entrance with coals from their camp fire, for fear of rattlesnakes, but not observing the foe within.

Just at daylight Mr. Farthingay was awakened by something that had just slidden over his prostrate body and fallen to the floor of the cavern. Opening his eyes he saw the reptile-like shape and snake head of one of these venomous creatures. It was traveling rapidly, and before Mr. Farthingay could reach his gun had encountered the sleeping form of Mr. James, whose breast it attempted to climb.

Disturbed by the touch of the animal, the unfortunate man, without opening his eyes, threw up one hand to dislodge whatever it was, and catching it by the tail would have thrown it from him, but the deadly teeth of the monster fixed immediately in his naked wrist, and though Mr. Farthingay hastened at once to his friend's relief and endeavored to pull it off, it held on like the grim death it was. Then, though fearing to strike the man instead of the reptile, he seized his gun and fired the contents into the creature's body. The monster let go its grip on Mr. James and made an effort to reach this new antagonist, but a second volley tore its head from its body.

Mr. Farthingay now turned his attention to his friend, and found that he had fainted. On being restored to consciousness Mr. James complained greatly of his wrist, which he said felt as if on fire, and which almost immediately began to swell. Immoderate thirst now set up and fever ensued, so becoming very much alarmed about his companion, Mr. Farthingay proposed setting off at once to town to procure medical attention for the wound, but Mr. James, fearing to die alone, implored his friend not to leave him.

In answer to his prayer the other agreed to await the course of the trouble, and fetching water from the creek bathed the wounded arm, but in less than half an hour the entire member was swollen to nearly three times its natural size, and from some slight discoloration assumed a deep purplish hue, nearly black, in splotches about the larger blood vessels.

Delirium now set in, and while anxious to summon assistance, Mr. Farthingay was forced to remain to restrain the now raving, shrieking man, who again and again attempted to throttle his companion when the latter endeavored to keep him from running out of the cavern to the creek. At last, worried out, Mr. Farthingay was flung aside by the frantic sufferer, who broke out of his grasp and ran to the stream howling. The other followed as rapidly as possible, but only arrived in time to see James struggle down the shelving bank, then totter forward and fall.

When he reached him it was to find life entirely extinct, James lying with his head in the water and his own teeth fixed in the swollen, gangrened arm. After exhausting such restoratives as he had with him, Farthingay dragged the body back to the cavern, when he set off to seek assistance. A few miles further on he came across an old Mexican who, living near the river in an adobe hut, was also the fortunate and opulent possessor of a donkey and cart.

With these latter the two men returned at once to the cavern, when James' body was placed on the cart and driven to town. Before leaving the place, however, Farthingay made a thorough search of the cavern, and discovering a female monster with six newly-born young ones, killed the entire lot. The mother, though shot nearly to pieces, made an assault on the hunter, but his heavy hunting boots prevented her from biting him. The old Mexican who accompanied Farthingay and his friend's rapidly decaying body to town, declared that James was the fourth man who has been killed by these deadly creatures on the river this spring. There is no known antidote for their poison."

In conclusion, gentlemen, I wish to state that I omitted in the above report before your honorable society all expert classification as to the particular species of insects or reptiles, preferring to leave this part to some one more familiar with the "termini technici,"—the main object being to have submitted a concise review of some of the original illustrations and observations on the life history of the more rare and venomous and as yet obscure reptiles.

Also to Dr. M. J. Bliem I wish to express herewith my sincerest thanks for his untiring efforts, favors and interest shown in the above matter, and particularly for having the original photos reproduced and framed—in the interest of this, the Scientific Society of San Antonio.

G. F. SIGMUND,
PRINTERY AND BINDERY,
SAN ANTONIO,
TEXAS.

SMITHSONIAN INSTITUTION LIBRARIES
3 9088 01303 0713